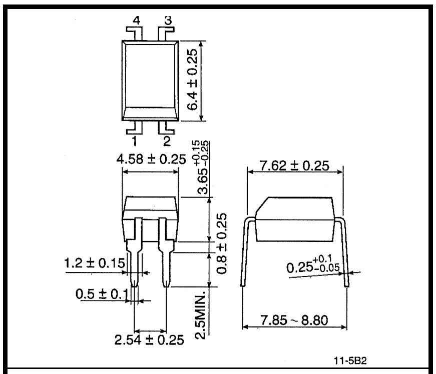
TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP627,TLP627-2,TLP627-4

Unit in mm

PROGRAMMABLE CONTROLLERS
DC-OUTPUT MODULE
TELECOMMUNICATION



TOSHIBA 11−5B2

Weight: 0.26 g

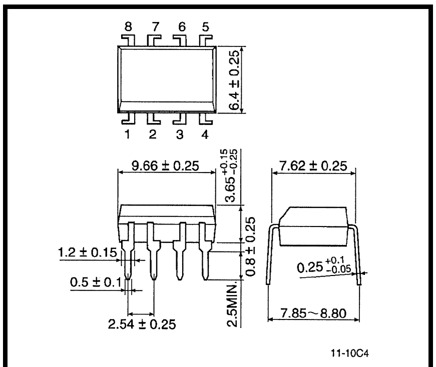
The TOSHIBA TLP627,-2 and -4 consists of a gallium arsenide infrared emitting diode optically coupled to a darlington connected phototransistor which has an integral base-emitter resistor to optimize switching speed and elevated temperature characteristics.

The TLP627-2 offers two isolated channels in a eight lead plastic DIP, while the TLP627-4 provide four isolated channels per package.

- Collector-Emitter Voltage : 300V(Min)
- Current Transfer Ratio : 1000%(Min)
- Isolation Voltage : 5000Vrms(Min)
- UL Recognized : UL1577,File No.E67349

	MADE IN JAPAN	MADE IN THAILAND
UL Recognized	E67349 *1	E152349 *1
BSI Approved	7426, 7427 *2	7426, 7427 *2

*1 UL1577
*2 BS EN60065: 2002, BS EN60950-1: 2002

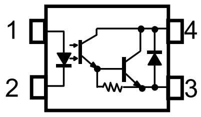


TOSHIBA 11−10C4

Weight: 0.54 g

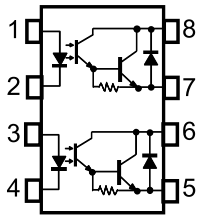
PIN CONFIGURATION (TOP VIEW)

TLP627



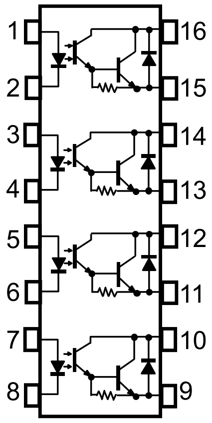
1: ANODE
2: CATHODE
3: EMITTER
4:COLLECTOR

TLP627-2

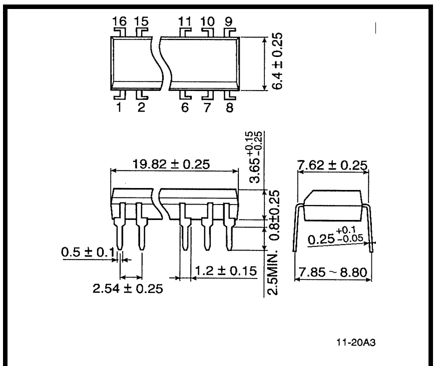


1,3: ANODE
2,4: CATHODE
5,7: EMITTER
6,8:COLLECTOR

TLP627-4



1,3,5,7 : ANODE
2,4,6,8 : CATHODE
9,11,13,15 : EMITTER
10,12,14,16 :COLLECTOR



TOSHIBA 11−20A3

Weight: 1.1 g

Absolute Maximum Ratings (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING		UNIT
			TLP627	TLP627-2 TLP627-4	
LED	Forward Current	I_F	60	50	mA
	Forward Current Derating	ΔI_F /°C	−0.7(Ta≥39°C)	−0.5(Ta≥25°C)	mA /°C
	Pulse Forward Current	I_{FP}	1(100μs pulse,100pps)		A
	Power Dissipation (1 Circuit)	P_D	100	70	mW
	Power Dissipation Derating (Ta≥25°C,1 Circuit)	ΔP_D /°C	-1.0	-0.7	mW /°C
	Reverse Voltage	V_R	5		V
	Junction Temperature	Tj	125		°C
DETECTOR	Collector-Emitter Voltage	V_{CEO}	300		V
	Emitter -Collector Voltage	V_{ECO}	0.3		V
	Collector Current	I_C	150		mA
	Collector Power Dissipation (1 Circuit)	P_C	150(*300)	100	mW
	Collector Power Dissipation Derating (Ta≥25°C,1 Circuit)	ΔP_c /°C	-1.5(*-3.5)	-1.0	mW /°C
	Junction Temperature	T_j	125		°C
Operating Temperature Range		T_{opr}	−55~100		°C
Storage Temperature Range		T_{stg}	−55~125		°C
Lead Soldering Temperature (10s)		T_{sold}	260(10sec)		°C
Total Package Power Dissipation		P_T	250(*320)	150	mW
Total Package Power Dissipation Derating (Ta≥25°C,1 Circuit)		ΔP_T/°C	-2.5(*-3.2)	-1.5	mW /°C
Isolation Voltage (AC,1min. , R.H.≤60%) (Note1)		BV_S	5000		Vrms

*IF=20mA Max

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

(Note1)Device considered a two terminal device : LED side pins Shorted together and DETECTOR side pins shorted together.

Recommended Operating Conditions

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	—	200	V
Forward Current	I_F	—	16	25	mA
Collector Current	I_C	—	—	120	mA
Operating Temperature	T_{opr}	−25	—	85	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Individual Electrical Characteristics (Ta=25°C)

	CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	V_F	I_F = 10 mA	1.0	1.15	1.3	V
LED	Reverse Current	I_R	V_R = 5 V	—	—	10	μA
LED	Capacitance	C_T	V = 0 , f=1MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	IC = 0.1mA	300	—	—	V
DETECTOR	Emitter-Collector Breakdown Voltage	$V_{(BR)ECO}$	IE = 0.1mA	0.3	—	—	V
DETECTOR	Collector Dark Current	I_{CEO}	V_{CE} = 200V	—	10	200	nA
			V_{CE} = 200V , Ta = 85°C	—	—	20	μA
DETECTOR	Capacitance Collector to Emitter	C_{CE}	V=0 , f=1MHz	—	10	—	pF

Coupled Electrical Characteristics (Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C/I_F	I_F=1mA , V_{CE}=1V	1000	4000	—	%
Saturated CTR	I_C/I_F(sat)	I_F=10mA , V_{CE}=1V	500	—	—	%
Collector-Emitter Saturation Voltage	V_{CE}(sat)	I_C=10mA , I_F=1mA	—	—	1.0	V
		I_C=100mA , I_F=10mA	0.3	—	1.2	

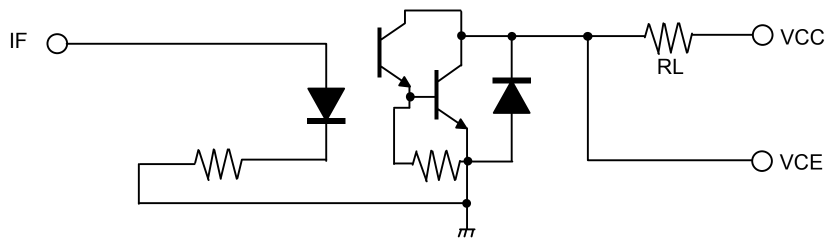
Isolation Electrical Characteristics (Ta=25°C)

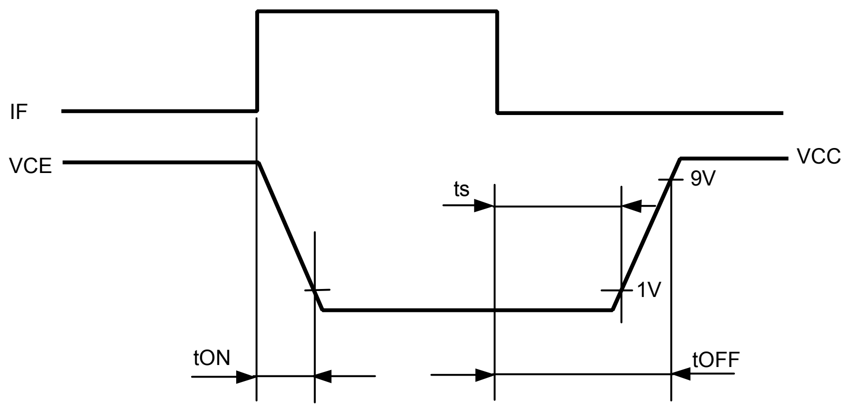
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	V_S=0 , f=1MHz	—	0.8	—	pF
Isolation Resistance	R_S	V_S=500V , R.H.≤60%	5×10^{10}	10^{14}	—	Ω
Isolation Voltage	BVs	AC, 1minute	5000	—	—	Vrms
		AC, 1second, in oil	—	10000	—	
		DC, 1 minute, in oil	—	10000	—	Vdc

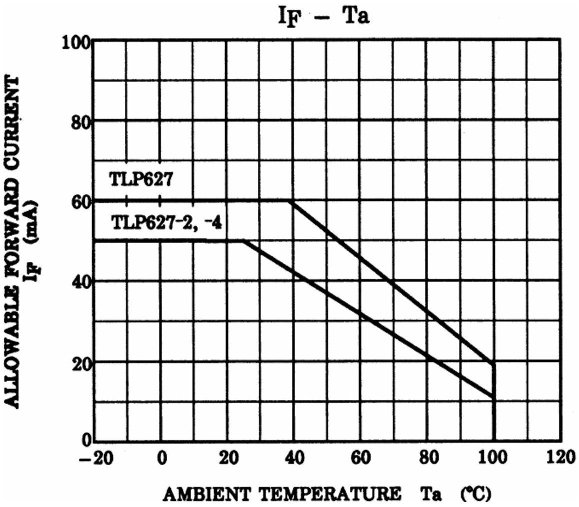
Switching Characteristics (Ta=25°C)

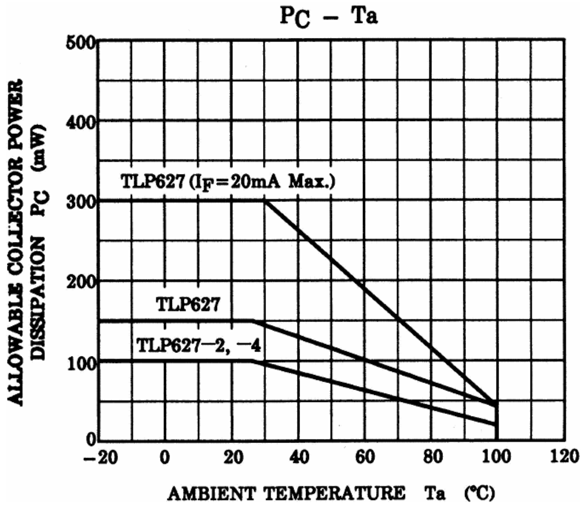
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	tr	V_{CC}=10V I_C=10mA R_L=100Ω	—	40	—	μs
Fall Time	tf		—	15	—	
Turn-on Time	ton		—	50	—	
Turn-off Time	toff		—	15	—	
Turn-on Time	tON	R_L=180Ω (Fig.1) V_{CC}=10V , I_F=16mA	—	5	—	
Strage Time	ts		—	40	—	
Turn-off Time	tOFF		—	80	—	

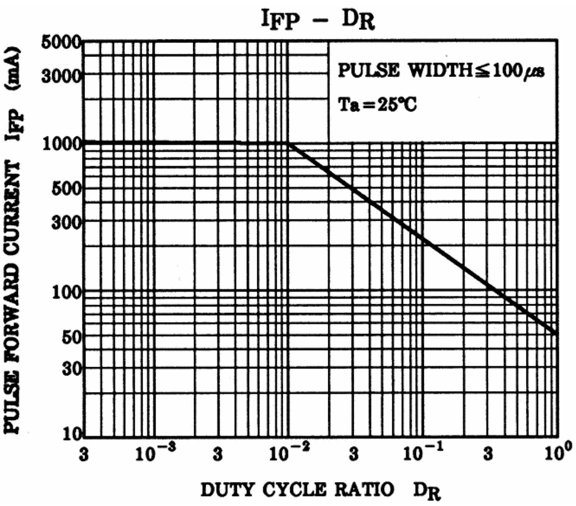
Fig.1 SWITCHING TIME TEST CIRCUIT

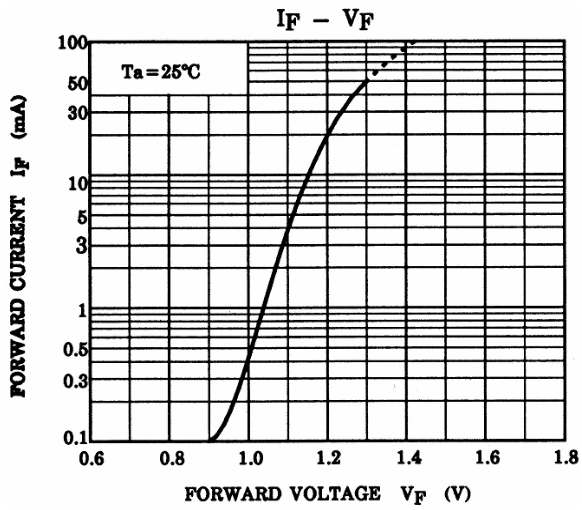


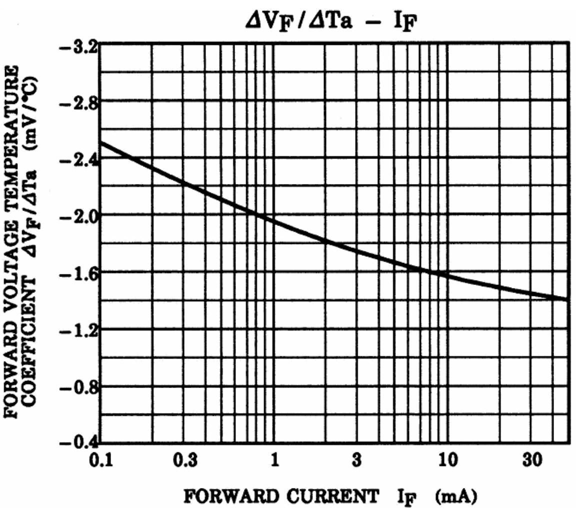


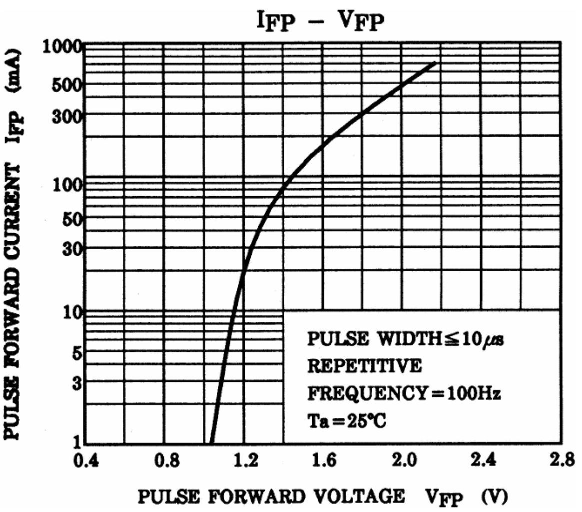

IF – Ta
ALLOWABLE FORWARD CURRENT IF (mA)
TLP627
TLP627-2, -4
AMBIENT TEMPERATURE Ta (°C)

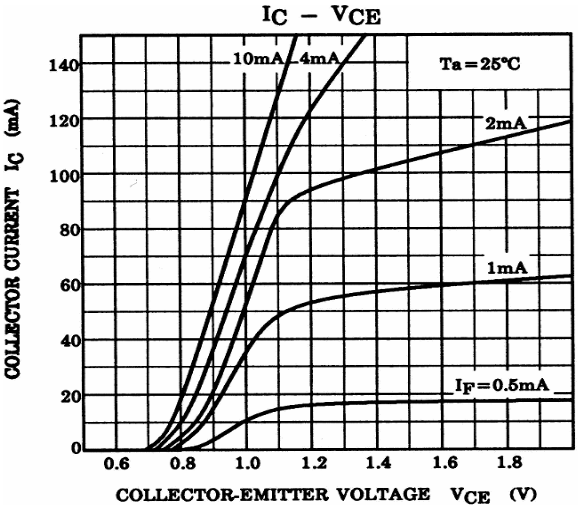

PC – Ta
ALLOWABLE COLLECTOR POWER DISSIPATION PC (mW)
TLP627 (IF=20mA Max.)
TLP627
TLP627–2, –4
AMBIENT TEMPERATURE Ta (°C)

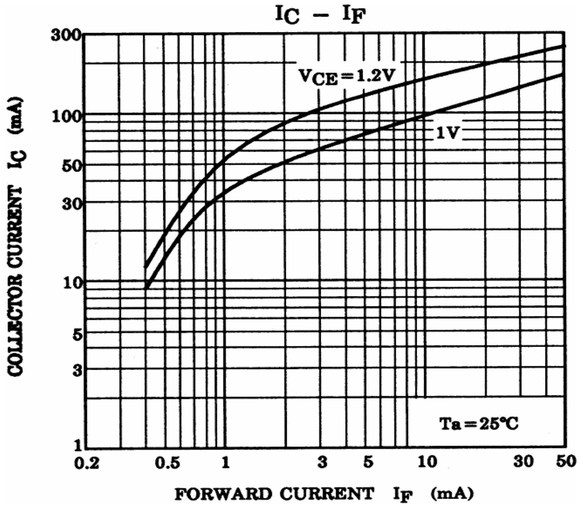

IFP – DR
PULSE FORWARD CURRENT IFP (mA)
PULSE WIDTH≤100μs
Ta=25°C
DUTY CYCLE RATIO DR

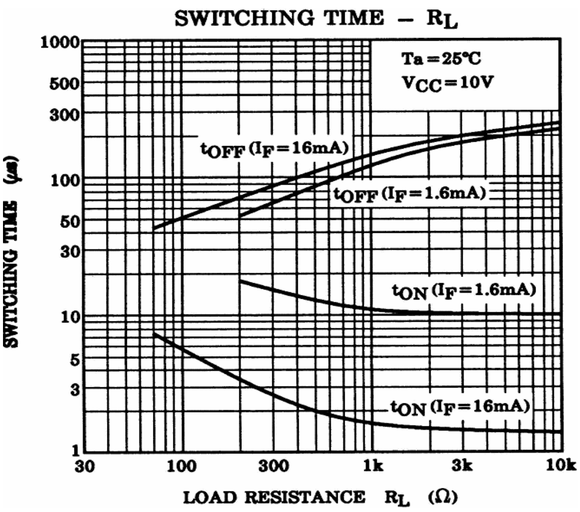

IF – VF
FORWARD CURRENT IF (mA)
Ta=25°C
FORWARD VOLTAGE VF (V)

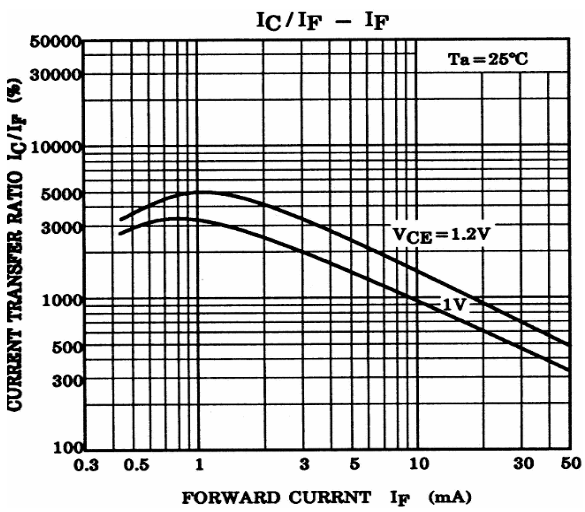

ΔVF / ΔTa – IF
FORWARD VOLTAGE TEMPERATURE COEFFICIENT ΔVF / ΔTa (mV / °C)
FORWARD CURRENT IF (mA)

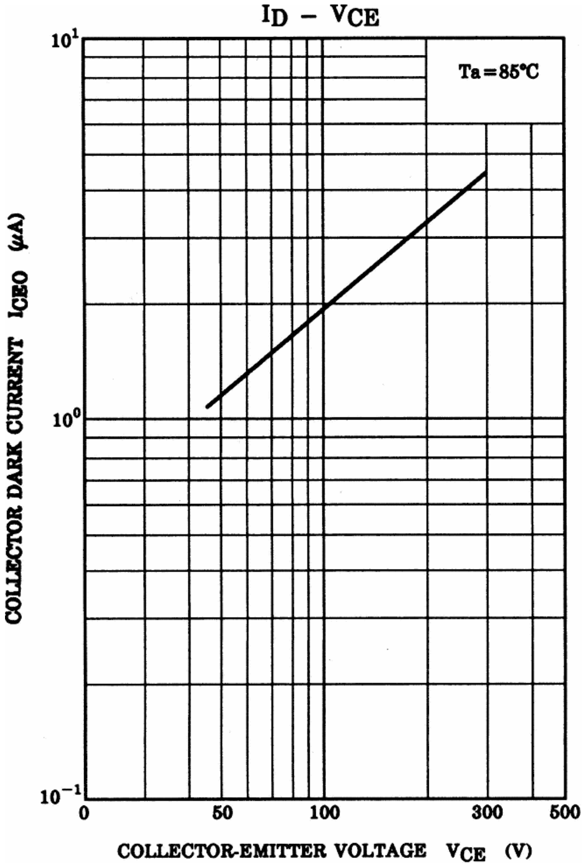

IFP – VFP
PULSE FORWARD CURRENT IFP (mA)
PULSE WIDTH≤10μs
REPETITIVE
FREQUENCY=100Hz
Ta=25°C
PULSE FORWARD VOLTAGE VFP (V)

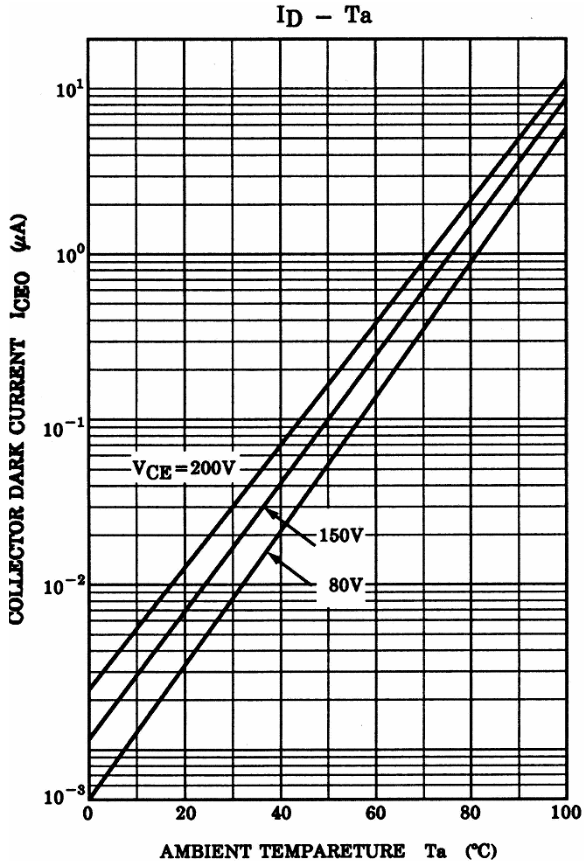

IC – VCE
Ta = 25°C
10mA
4mA
2mA
1mA
IF = 0.5mA
COLLECTOR CURRENT IC (mA)
0
20
40
60
80
100
120
140
0.6
0.8
1.0
1.2
1.4
1.6
1.8
COLLECTOR-EMITTER VOLTAGE VCE (V)

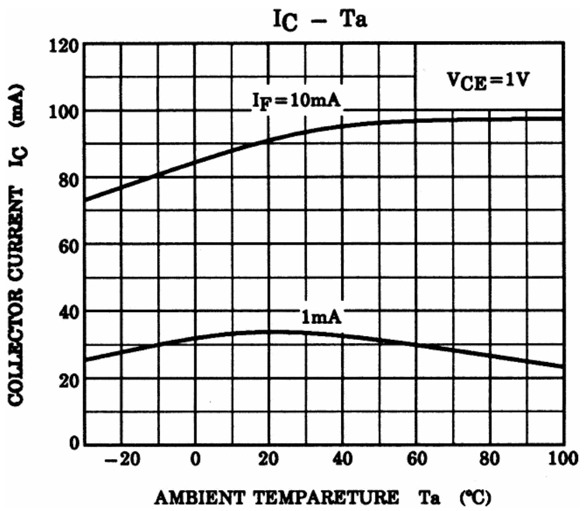

IC – IF
VCE = 1.2V
1V
Ta = 25°C
COLLECTOR CURRENT IC (mA)
300
100
50
30
10
5
3
1
0.2
0.5
1
3
5
10
30
50
FORWARD CURRENT IF (mA)

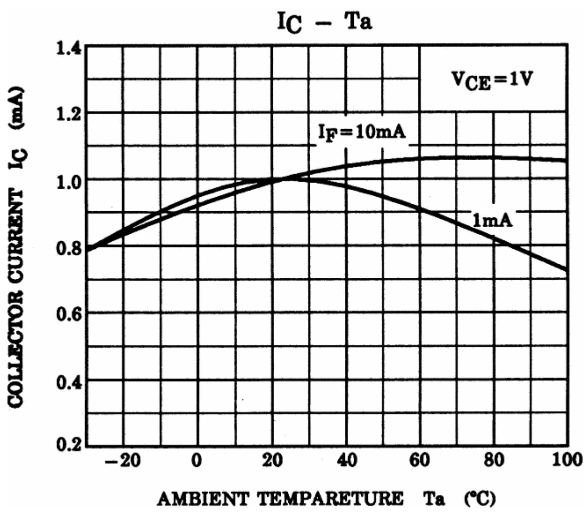

SWITCHING TIME – RL
Ta = 25°C
VCC = 10V
tOFF (IF = 16mA)
tOFF (IF = 1.6mA)
tON (IF = 1.6mA)
tON (IF = 16mA)
SWITCHING TIME (μs)
1000
500
300
100
50
30
10
5
3
1
30
100
300
1k
3k
10k
LOAD RESISTANCE RL (Ω)


IC / IF – IF
Ta = 25°C
VCE = 1.2V
1V
CURRENT TRANSFER RATIO IC/IF (%)
50000
30000
10000
5000
3000
1000
500
300
100
0.3
0.5
1
3
5
10
30
50
FORWARD CURRNT IF (mA)


ID – VCE
Ta = 85°C
COLLECTOR DARK CURRENT ICEO (μA)
COLLECTOR-EMITTER VOLTAGE VCE (V)


ID – Ta
VCE = 200V
150V
80V
COLLECTOR DARK CURRENT ICEO (μA)
AMBIENT TEMPARETURE Ta (°C)


IC – Ta
VCE = 1V
IF = 10mA
1mA
COLLECTOR CURRENT IC (mA)
AMBIENT TEMPARETURE Ta (°C)


IC – Ta
VCE = 1V
IF = 10mA
1mA
COLLECTOR CURRENT IC (mA)
AMBIENT TEMPARETURE Ta (°C)

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20070701-EN

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